MCCORMICK, PAULDING & HUBER LLP
City Place II
185 Asylum Street
Hartford, CT 06103-4102
Tel. (860) 549-5290

"EXPRESS MAIL" MAILING LABEL NUMBER EV337022577US
DATE OF DEPOSIT February 11, 2004
I HEREBY CERTIFY THAT THIS PAPER OR FEE IS BEING DEPOSITED WITH THE UNITED STATES POSTAL SERVICE "EXPRESS MAIL POST OFFICE TO ADDRESSEE" SERVICE UNDER 37 C.F.R. 1.10 ON THE DATE INDICATED ABOVE AND IS ADDRESSED TO THE COMMISSIONER FOR PATENTS, MAIL STOP PATENT APPLICATION, P.O. BOX 1450, ALEXANDRIA, VA 22313-1450

LISA M. TINNIRELLA
(TYPED NAME OF PERSON MAILING PAPER OR FEE)
Lisa M. Tinnirella
(SIGNATURE OF PERSON MAILING PAPER OR FEE)

Mail Stop **PATENT APPLICATION**
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

ATTACHMENT TO A PATENT APPLICATION

DOCKET NO.: 5001-438-1

ENTITLED: CYLINDER RETAINING MECHANISM

INVENTOR(S): Brett Curry; Craig A. Mariani; and Richard J. Mochak

INCLUDING: Specification; Claims; Abstract; and six sheets of Informal Drawings

CYLINDER RETAINING MECHANISM

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application Serial No. 60/446,870, filed on February 12, 2003, and herein incorporated by reference in its entirety.

FIELD OF THE INVENTION

[0002] This invention relates in general to a cylinder retaining mechanism, and deals more particularly with a cylinder retaining mechanism for a revolver which assures that the cylinder remains in its closed position even during, and immediately following, a discharge of a round of ammunition.

BACKGROUND OF THE INVENTION

[0003] Known revolvers employ a rotatable cylinder to selectively position one of a plurality of rounds of ammunition in opposition to the firing bore of the revolver. The cylinder is typically housed within a frame of the revolver for selective movement in or out of the frame during a loading or unloading operation.

[0004] Figure 1 illustrates one example of a known revolver **10**. As shown in Figure 1, the revolver **10** includes a frame **12**, a barrel **14**, an ejector rod assembly **18** and a cylinder **20** having a plurality of longitudinal bores **22** which are adapted to selectively position, in sequence, rounds of ammunition (not shown) in opposition to the firing bore of the barrel **14**.

[0005] A yoke stud **24** (shown in phantom) is integrally mated to the frame **12** and provides an axis of rotation to selectively pivot both the yoke **16** and the cylinder **20** from its open position, shown in Figure 1, to its closed position. A spring biased ball plunger **28** is integrally mated to the yoke **16** and communicates with a ball cavity **30** (shown in phantom) formed in the body of the frame **12**.

[0006] While successful to a certain degree, the interaction between the spring biased ball plunger **28** and the ball cavity **30** may experience sporadic, operational complications during, and immediately following, the discharge of a round of ammunition. When a round is discharged, the forces which propel the round down the length of the barrel **14** exert a corresponding force in the opposite direction, that is, towards the rear, handgrip portion of the revolver **10**. Although the effect of this opposite force is marginal on the interconnected elements of the revolver **10**, the manufacturing tolerances inherent in the revolver **10** permit a minute amount of structural translation to occur as a result of this incident and opposite discharge force.

[0007] The effect of the structural translation of certain elements in the revolver **10**, as a result of the discharge of a round of ammunition and the associated manufacturing tolerances of the revolver **10**, may cause the cylinder and yoke assembly, **20/16**, to move slightly rearwardly, towards the handgrip portion of the revolver **10**. Referring again to Figure 1, it can be seen that the rearward movement of the yoke **16** may cause the spring biased ball plunger **28** to disengage from the ball cavity **30**, thus facilitating the unintended pivoting of the cylinder **20** from its closed position, to the open position shown in Figure 1. The possibility of the disengagement of the spring biased ball plunger **28** from the ball cavity **30** may increase in proportion to the age of the revolver **10**, owing to the increasing age and reduced resilience of the biasing spring, or the like, which serves to bias the ball plunger **28** into contact with the restraining ball cavity **30**.

[0008] It is therefore the general object of the present invention to provide a cylinder retaining mechanism which advantageously utilizes the recoil forces generated by a firearm during discharge.

SUMMARY OF THE INVENTION

[0009] It is an object of the present invention to provide a cylinder retaining mechanism for a revolver.

[0010] It is another object of the present invention to provide a cylinder retaining mechanism for a revolver which securely maintains the cylinder in its closed position.

[0011] It is another object of the present invention to provide a cylinder retaining mechanism for a revolver which securely maintains the cylinder in its closed position, even during and immediately following the discharge of a round of ammunition from the revolver.

[0012] It is another object of the present invention to provide a cylinder retaining mechanism for a revolver which harnesses the force from a discharged round of ammunition to assist in the maintenance of the cylinder in its closed position.

[0013] It is therefore an object of the present invention to provide a firearm having a frame with a firing bore and a cylinder having a longitudinal bore, the cylinder being operatively connected to the frame such that the cylinder selectively pivots between a first (closed) position in which the longitudinal bore is substantially aligned with the firing bore, and a second (open) position in which the longitudinal bore is not substantially aligned with the firing bore. A cylinder retaining mechanism is provided for selectively retaining the cylinder in the first position, and includes a biasing member that is integrally mated with the frame. The orientation of the biasing member is designed to remain static when the cylinder pivots between the first position and the second position.

[0014] These and other objectives of the present invention, and their preferred embodiments, shall become clear by consideration of the specification, claims and drawings taken as a whole.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] Figure 1 illustrates an operational portion of a known revolver.

[0016] Figure 2 is a partial cross-sectional view of a revolver having a cylinder retaining mechanism, according to one embodiment of the present invention.

[0017] Figure 3 is a front-side, isometric view of the stripped-down revolver shown in Figure 2, including one portion of the cylinder retaining mechanism.

[0018] Figure 4 is an isometric view of a yoke for use with the revolver of Figure 2, comprising another portion of the cylinder retaining mechanism.

[0019] Figure 5 is a backside, isometric view of the stripped-down revolver shown in Figure 2, including the yoke of Figure 4.

[0020] Figure 6 is a front-side, isometric view of the stripped-down revolver shown in Figure 2, including the yoke of Figure 4.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0021] Figure 2 is a partial cross-sectional view of a revolver **100** having a cylinder retaining mechanism according to one embodiment of the present invention. As shown in Figure 2, the revolver **100** includes a frame **112**, a barrel **114**, an ejector rod assembly **116** and a cylinder **118** having a plurality of longitudinal bores **120** which are adapted to selectively position, in sequence, rounds of ammunition (not shown) in opposition to the firing bore of the barrel **114**.

[0022] A yoke stud **122** is integrally mated to the frame **112** and provides an axis of rotation for the yoke (not shown). A spring biased ball plunger **124** is also integrally mated to the frame **112** and comprises one element of the cylinder retaining mechanism, as will be explained in more detail later.

[0023] It is therefore an important aspect of the present invention that, in contrast to known revolvers, the spring biased ball plunger **124** is integrally mated to the frame **112** of the revolver **100**. By forming the spring biased ball plunger **124** in the frame **112** of the revolver **100** instead of on the yoke element, as was discussed previously, the present invention is able to constructively utilize the recoil forces resulting from the discharge of a round of ammunition to maintain the cylinder **118** in its closed position, shown in Figure 2. The manner

in which the spring biased ball plunger **124** accomplishes this task will become clear by a review of the subsequent drawing figures and associated discussions relating thereto.

[0024] Figure 3 illustrates a stripped-down version of the frame **112** showing the spring biased ball plunger **124** and a stud recess **126**. The stud recess **126** is adapted to secure the stud **122** (shown in Figure 2) therein and provides for selective rotation of the yoke element, to be described shortly.

[0025] Turning now to Figure 4, a yoke **128** is shown, comprising another element of the cylinder retaining mechanism of the present invention. As shown in Figure 4, the yoke **128** includes a stud cavity **130** which pivotably mates with and accommodates the stud **122** (shown in Figure 2). An ejector bore **132** is also defined in the yoke **128** and provides an aperture through which the ejector rod assembly **116** (shown in Figure 2) extends, thereby operatively connecting the cylinder **118** (shown in Figure 2) to the movement of the yoke **128** as it pivots about the stud **122**. A ball cavity **134** is formed as a depression in the upper portion of the yoke **128** and is designed to selectively accommodate the spring biased ball plunger **124** (shown in Figure 2) when the yoke **128**, and the cylinder **118** (shown in Figure 2), are in their closed positions.

[0026] It is therefore another important aspect of the present invention that the ball cavity **134** is formed on the yoke **128** itself, rather than on the frame of the revolver **100**, in contrast to known revolver architectures. By arranging the ball cavity **134** on the yoke **128** itself, the present invention is able to constructively utilize the recoil forces resulting from the discharge of a round of ammunition to maintain the cylinder **118** (shown in Figure 2) in its closed position, with great effectiveness.

[0027] Figures 5 and 6 illustrate a rear-side view of the stripped-down frame **112** and a front-side view of the stripped-down frame **112**, respectively. As shown in Figure 5, the yoke **128** integrally mates with the profile of the frame **112** when it is oriented in its closed position. In the closed position of Figure 5, the rear of

the spring biased ball plunger **124** can be seen, with the ball of the spring biased ball plunger **124** being securely accommodated within the hidden ball cavity **134** (shown in Figure 4) of the yoke **128** (shown in Figure 4). The ejector bore **132** is also shown in Figure 5 and permits an arbor portion **136** (shown in Figure 6) of the ejector rod assembly **116** (shown in Figure 2) to pass therethrough, upon which the cylinder **118** (shown in Figure 2) is rotatably supported.

[0028] Operation of the cylinder retaining mechanism will now be explained in conjunction with Figures 2-6 in combination. When the cylinder **118** of the revolver **100** is in its closed position, shown in Figure 2, the cylinder **118** may be indexed in a known manner to position one of the plurality of longitudinal bores **120** opposite the firing bore of the barrel **114**. Upon actuation of an unillustrated trigger assembly, the discharge of a round of ammunition from the longitudinal bores **120** is initiated. The forces which propel the round down the length of the barrel **114** exert corresponding recoil forces in the opposite direction, that is, towards the rear, handgrip portion of the revolver **100**. As discussed previously in connection with known revolver architectures, although the effect of this opposite force is marginal on the interconnected elements of the revolver **100**, the manufacturing tolerances inherent in the revolver **100** may permit a minute amount of structural translation to occur as a result of this incident and opposite discharge force.

[0029] The effect of this discharge recoil force may cause the cylinder and yoke assembly, **118/128**, to move slightly rearwardly, towards the handgrip portion of the revolver **100**. In contrast to known revolver architectures, however, it can be seen that the rearward movement of the yoke **128** of the present invention will cause the ball cavity **134** to move farther in the engaging direction, towards the spring biased ball plunger **124**. Thus, the interconnectivity of the spring biased ball plunger **124** and the ball cavity **134** is increased during and immediately following the discharge of a round of ammunition.

[0030] It is therefore another important aspect of the present invention that the recoil forces which result from a discharge of a round of ammunition are constructively utilized by the revolver **100** to maintain the cylinder in its closed

position. That is, as compared to known revolver architectures, any backwards, translational movement of integral elements of the revolver **100** actually reinforces the mating between the yoke **128** and the spring biased ball plunger **124**.

[0031] While the ball cavity **134** has been described as being formed on the upper portion of the yoke **128**, the present invention is not limited in this regard as the ball cavity **134** may alternatively be formed anywhere on the yoke **128** provided that the spring biased ball plunger **124** nests within the ball cavity **134** when the yoke **128** and the cylinder **118** have been pivoted to their closed positions. Indeed, it will be readily appreciated that the structural configuration and orientation of the ball cavity **134** and the spring biased ball plunger **124** is but one expression of a primary objective of the present invention to constructively utilize the discharge force to assist in maintaining the cylinder **118** in its closed position during, and immediately following, the discharge of a round of ammunition.

[0032] It will also be readily appreciated that although a spring biased ball plunger **124** has been described, alternative biasing devices apart from springs, and alternative elements apart from substantially spherical, ball-shaped structures may be substituted therefor without departing from the broader aspects of the present invention. Moreover, the present invention equally contemplates that the cylinder retaining mechanism shown in Figures 2-6 may be utilized alone, or in conjunction with other, known cylinder retaining mechanisms.

[0033] While the invention has been described with reference to the preferred embodiments, it will be understood by those skilled in the art that various obvious changes may be made, and equivalents may be substituted for elements thereof, without departing from the essential scope of the present invention. Therefore, it is intended that the invention not be limited to the particular embodiments disclosed, but that the invention includes all equivalent embodiments.